



Energy White Paper 2014 Green Paper submission form (including confidential)

This form can be sent by email to ewp@industry.gov.au or by mail to:

The Energy White Paper Taskforce
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Position in Organisation (if relevant)	Convenor, Climate and Health Alliance (CAHA)
Type of Organisation. Please choose from the dropdown list right	Non-Government Organisation
Sector. Please choose from the dropdown list right	Health Care and Social Assistance
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The Australian Government seeks comments on ways the Goals set out at the beginning of each chapter of the Energy Green Paper, could be achieved. A field for general comments is provided at the end of the template.

1. Attracting energy resources investment

Below is a brief summary of the actions the Australian Government is either currently pursuing, or which are proposed, to achieve the Goals in this chapter.

Streamline regulatory processes

The Australian Government is committed to ensuring environmental decisions are made as efficiently as possible.

The Australian Government has accredited the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) as the regulator for offshore petroleum activities under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is now working to extend this accreditation to coastal waters in states and territories that confer their regulatory powers to NOPSEMA. These activities will reduce duplication, complexity, cost and the time taken for environmental and other approvals.

The Australian Government supports new major projects through its Major Projects Facilitation Programme. It has also established a Major Projects Office in Tasmania to assist with Australian Government approvals. A national office to monitor and benchmark various approvals processes is also a possibility.

Improving labour productivity and skills

The Australian Government will improve labour productivity through the introduction of greenfields provisions in the *Fair Work Act 2009*. It will also undertake a more general Productivity Commission review of the Act, and re-establish the powers of the Australian Building and Construction Commissioner (ABCC).

The Australian Government is working with industry and the states and territories to reform the Vocational Education and Training (VET) system.

Foreign workers complement locally available skills. The Australian Government will improve Migration Agreement processing and review the integrity of the subclass 457 visas.

Create supply chain opportunities and Indigenous employment

The Australian Government has introduced the Entrepreneurs' Infrastructure Programme and Industry Skills Fund. The programmes will encourage investment and local business development.

The Australian Government will support local supply chains through the Entrepreneurs' Infrastructure Programme. It will also encourage Indigenous business engagement and employment, considering the findings of the Forrest Review.

Better geoscience to encourage investment and assess impacts

The Australian Government has a pre-competitive geoscience programme. It is also improving access to land and marine environmental information to speed up, and reduce the cost of, environmental impact assessments.

Identifying and addressing infrastructure constraints

The Australian Government is committing \$50 billion to transport infrastructure. It is encouraging states and territories to privatise their assets through the Asset Recycling Initiative, and recycle funds into new infrastructure projects. The Australian Government is also carrying out periodic reviews to identify infrastructure bottlenecks.

Promoting exports

The Australian Government is promoting energy exports and attracting investment in new technologies by appointing a Senior Investment Specialist in Austrade.

The Government seeks comments on ways the following Goals for this chapter could be achieved.

Goals

- Streamline environmental and other approvals
 - Outcome: More certain, timely and accessible approvals. Better regulation will lower costs to business, boost productivity and enhance Australia's international competitiveness.
- Better skills and workforce productivity, including access to skilled migration
 - Outcome: Industry has access to the skills it needs for timely and cost-effective projects, which will encourage future investment.
- Create supply chain opportunities and Indigenous employment
 - Outcome: Local small-to-medium enterprises (SMEs) more involved in supply chains, lowering project costs and growing local economies. More Indigenous Australians employed in the energy resources sector.
- Enhance pre-competitive geoscience and improve access to environmental data
 - Outcome: Lower costs and exploration risk. Reduced duplication and regulatory burden. Improved community engagement. Better-informed decision-making and environmental management.
- Help to identify and address infrastructure bottlenecks
 - Outcome: Industry has access certainty, reducing infrastructure duplication and cost.
- Promote Australia's energy products, technology and services exports
 - Outcome: Increase the export earnings of Australia's energy resources, products and skills.

Please provide any comments on Attracting energy resources investment below:

NB:This submission is developed using content from an upcoming paper on Health and Energy Choices published by the organisations listed above. All references that appears as numbers in the text can be supplied on request.

All sources of energy to support human activity have implications for health. We, as a society, need to choose how we harvest energy so that we use the ones with the least overall adverse impacts on health.

The economic benefits to Australians from the energy sector, particularly from mining, appear to be overstated. The entire mining industry employs 269, 700 people, or around 2% of the total workforce.⁵⁴ Over 80% of the mining industry in Australia is foreign owned.⁵⁵

Mining companies in Australia pay much less tax than other companies: 13.9% compared to the 30% corporate tax rate.⁵⁶ Mining also receives far more subsidies than other industries with miners the recipients of over \$4 billion in annual subsidies from the federal government,⁵⁷ while the total subsidies provided to the fossil fuel sector amount to over \$10 billion annually.⁵⁸

Fossil fuel mining and export contributes to the recent rapid expansion in mining which has brought broader economic disadvantages: it drives up the value of the Australian dollar and makes Australian exports more expensive, thereby reducing demand for other exports.⁵⁹

The mining boom has also driven up labour costs, making it increasingly difficult to attract and retain staff in non-mining industries. This is impacting important service industries including health and education and policing, where shortages put health, safety and future economic security at risk.

A recent paper by Economists at Large and the Australia Institute⁶⁰ evaluated the economics of coal and coal seam gas projects in NSW and found that:

- the economic benefits of projects were routinely overstated;
- the environmental harms were downplayed;
- the volumes of greenhouse gases produced were seriously under-reported;
- the employment benefits including potential jobs created were overstated;
- the costs to other industries from taking workers away and effects on the exchange rate were ignored; and
- the health costs were not considered, despite evidence of increased health costs from increased morbidity and mortality and reduced productivity.

The flawed and overinflated estimation of economic costs of energy projects and failure to account for adverse social, health and environmental impacts as well as greenhouse gas implications reveals that many energy projects in Australia are more likely to impose a significant economic cost on communities and taxpayers. These costs may outweigh the value of the projects; however the international companies, that are the proponents of these projects and recipient of their profits, bear none of these costs.

A recent review of broad health indicators across 40 years in 41 countries revealed large unaccounted for costs associated with coal consumption.¹⁴¹ Studies from the US National Academies of Sciences suggest the 'hidden costs' of energy systems (i.e. the monetized value of energy related burdens and damages) cost the US more than \$120 billion in 2005.¹⁴²

A more recent analysis of the costs associated with the lifecycle of coal in the US – extraction, transport, processing, and combustion – estimates the cost at over half a trillion dollars annually.¹⁴³ Accounting for these damages would “conservatively double to triple” the price of electricity from coal.¹⁴⁴

In Australia, it is estimated that the adverse health impacts from pollutants produced from coal fired electricity generation cost A\$2.6 billion annually.¹ If the currently unaccounted for total climate and health costs are considered (including greenhouse gas effects) the estimate rises to \$8.3 billion annually.¹⁴⁶

The production of petroleum poses risks to health through exposure to chemical carcinogens and its combustion for transport is a major source of air pollution that causes respiratory, cardiovascular disease and cancer.² Air pollution costs from power generation, industry and transport in NSW are estimated at \$4.7 billion annually.³

A 2005 estimate of the health costs associated with air pollution from transport put the national cost at \$3.3 billion annually.⁴ The economic costs of adverse health impacts associated with other energy resources and from climate change in Australia are as yet unquantified.

However the global costs to human health associated with the carbon intensive energy systems of the global economy is \$540 billion each year, excluding health impacts resulting from climate change.⁵ If climate impacts on health are included, the total current cost to the global economy is estimated to be \$1.2 trillion annually.⁶

Continued intensive usage of fossil fuel energy sources are estimated to lead to these costs doubling over the next decade and a half, causing six million deaths each year and costing 3.2% of global GDP by 2030. A business as usual emissions trajectory would see costs continue to increase, with damages accelerating throughout this century.

Communities across Australia are being affected by coal mining, transportation and combustion, and unconventional gas exploration and production. Communities living near proposed coal mines, coal mine expansions, coal seam and shale gas extraction potentially face displacement, water insecurity, air and noise pollution, risks to water quality, loss of amenity and social capital, and serious physiological and psychological health risks.

Those being exposed to coal transport face unacceptable levels of noise and air pollution that regularly breach air quality standards. Those living in proximity to coal fired power stations face risks of respiratory, cardiovascular, neurological disease and

developmental effects.⁷

Air pollution from transport kills more people each year than the road toll.⁸ The evidence of harm to human health directly related to fossil fuels documented in this paper reinforces the imperative extolled by scientific experts around the world - that shifting away from fossil fuels is urgent and necessary to reduce widespread risks to human health and wellbeing and help prevent further climate change.

Fossil fuel energy production exposes communities to air, water and soil pollution from gases and other chemicals that are directly harmful to health. Local pollutants such as coal dust, particulate matter, and other toxins (eg arsenic, sulphuric and nitric acids, boron, fluorides and mercury) are produced from the mining and combustion of coal, while the combustion of fossil fuels for transport is associated with the production of particulates, nitrogen dioxide, ground level ozone and carbon monoxide.²⁵

In 2004, Australian government scientists estimated that 2, 400 of the 140, 000 Australian deaths each year were linked to air quality – a number they say would be much greater if the longer term contribution of air toxins to cancer mortality were included.

In contrast, renewable energy, including solar and wind, present clean, safe and reliable energy alternatives.

Australia must, for reasons related to global warming and the protection of the health and wellbeing of the community, transition as quickly as possible to 100% renewable energy systems for electricity generation, heating and cooling systems, and transport.

2. Electricity prices

Below is a brief summary of the actions the Australian Government is either currently pursuing, or which are proposed, to achieve the Goals in this chapter.

Increase the range of tariff choices

The Australian Government is working with states and territories on electricity pricing so users pay the real cost of electricity based on the time at which they use it, as well as their fair share of the costs of the poles and wires. Consumers (or their chosen third party representatives) need easy access to their energy use data through improved metering capability (smart meters) to enable time-of-use pricing. The Australian Government is waiting for the Australian Energy Market Commission's (AEMC) rule change on the distribution of costs of electricity networks.

Reliability standards should reflect consumer expectations

The Australian Government is working with states and territories to establish a framework for setting reliability standards that take into account the value consumers place on reliable electricity supply. However, individual energy consumers have limited opportunity to engage in electricity market policy and planning. Therefore, the Council of Australian Governments (COAG) Energy Council is setting up Energy Consumers Australia to provide for effective consumer advocacy.

Improve the efficiency of electricity use

See Chapter 4

Rationalise emissions reductions schemes

Government interventions in energy markets have proven to be an expensive means of achieving environmental outcomes. The Australian Government could seek COAG agreement to a set of principles for interventions to ensure they are cost-effective.

Remove unnecessary regulation and encourage privatisation

The Australian Government has established the Asset Recycling Initiative, which will introduce new incentive payments for states and territories that make progress on privatisation by selling their assets and redirecting the funds into productive infrastructure. The Australian Government is also undertaking a comprehensive review of competition laws and policy.

The Australian Government could investigate whether there are any unnecessary regulatory barriers preventing exit of surplus generation capacity.

The Government seeks comments on ways the following Goals for this chapter could be achieved.

Goals

- Pursue tariff reform and improved consumer access (including controlled third party) to energy use data, including electricity network tariff reform to limit cross-subsidies
 - Outcome: Consumers are better informed, have tariff choice and know how to manage energy use and cost. Energy users pay their fair share of the costs of the poles and wires that supply electricity.
- Ensure reliability standards do not encourage unnecessary investment in electricity networks
 - Outcome: Consumers do not receive higher reliability standards than they would be willing to pay for if they understood the impact on electricity prices.
- Improve the efficiency of electricity use
 - Outcome: Electricity cost savings for consumers.
- Rationalise emissions reductions actions to reduce unnecessary costs
 - Outcome: Consumers do not pay more due to market distortion.
- Remove unnecessary regulatory barriers and market interventions, and encourage further privatisation
 - Outcome: Better prices and services for consumers through more competition, efficiency and innovation

Please provide any comments on Electricity prices below:

National and state energy policy continues to favour coal over renewables. Government support for coal-fired electricity was \$3.6 billion per year in 2012-13, compared to \$1.4 billion for renewable energy.²⁴

Increasingly, reports are emerging that document a failure of the current system of regulation with respect to energy projects in Australia.

An independent medical evaluation of the health impacts associated with a coal seam gas development in Queensland found no baseline air or water monitoring occurred prior to the Queensland Government permitting widespread development of coal seam gas in proximity to family homes.⁵⁰ No ongoing health study or surveillance is in place or any ongoing testing to monitor exposure to health risks.

The investigation of local health complaints by the Queensland Department of Health was unable to confirm reasons for the symptoms experienced but relied on industry commissioned data, self presentation for medical review and involved no site visits by any medically trained staff.

According to a recent report by Doctors for the Environment Australia, there is no adequate evaluation of the implications for human health occurring during the approvals process for energy resource projects.⁵¹ While there is an expectation that health impacts be addressed during mandatory Environmental Impacts Assessments, the evaluation of potential health risks by state governments is often rudimentary and fails to adequately protect the health of the community.

Further regulatory failures are leading to excessive exposures to pollutants such as coal dust among communities in Brisbane,⁵² and Newcastle, where national air quality standards are failing to be enforced and communities are being exposed to levels of air pollution that frequently exceed national air quality standards. The standard for PM10 was exceeded more than 115 times in the Hunter during 2012.⁵³

The influence of the fossil fuel sector in decisions regarding energy choices is evident in the development of federal policy and in the failure of state governments to regulate to protect health and environmental concerns.268, 269

Industry proponents routinely overstate the economic benefits of mining and gas projects; downplay the greenhouse gas emissions and other environmental costs; ignore the costs to other industries; and ignore the health costs.270



3. Building gas supply and improving market operation

Below is a brief summary of the actions the Australian Government is either currently pursuing, or which are proposed, to achieve the Goals in this chapter.

Addressing near-term east coast gas supply

More gas supply needs to be supplied quickly to avoid potential near-term east coast shortages. Social licence and landholder concerns have led state governments to introduce regulatory barriers.

Sustaining national gas supply

Environmental and social concerns about new onshore gas projects have led to restrictive regulation and community disruption of projects. The Australian Government can apply the capabilities of national science institutions to improve the independent evidence base for assessing the impact of proposed projects. It will also work with states and territories to remove unnecessary barriers to new projects.

Gas prices are not transparent

There is limited reporting of gas production potential, and limited trading information on the extent of competition in gas markets. There are also some exemptions from competition laws to allow joint marketing. Many of the underlying sources of competition are therefore difficult to assess. The Australian Government is considering either an Australian Consumer and Competition Commission (ACCC) Price Inquiry or Productivity Commission Review into these competition issues to help identify any barriers to competition as the market responds to current high gas price signals.

Improving gas market function

The nature of gas market bilateral trading means there is limited supply and price information available for consumers to understand market conditions. The Australian Government will implement further reporting through the Bureau of Resources and Energy Economics (BREE) and Australian Energy Market Operator (AEMO) to provide greater transparency.

Domestic gas market function would be enhanced by a comprehensive development strategy for the unconventional gas industry. Improved trading mechanisms could include further trading hubs and pipeline capacity trading.

The Government seeks comments on ways the following Goals for this chapter could be achieved.

Goals

- Bring on new gas supply as quickly as possible
 - Outcome: Avoid potential supply shortages so that domestic gas users do not pay higher prices than necessary.
- Improve availability and quality of market information to improve market transparency and competition
 - Outcome: Gas sellers and buyers have more certainty about the availability of supply and pricing, and the market is more transparent and competitive.
- Implement other gas market development priorities to expedite gas market reform
 - Outcome: A development strategy for the unconventional gas industry. More flexible and transparent market arrangements.

Please provide any comments on Building gas supply and improving market operation below:

Conventional gas exploration and drilling carries risks for human health, but these are considerably less than coal and oil.¹⁵⁰ The main public health risk associated with conventional gas electricity generation is associated with air pollution from power plant operations,¹⁵¹ and by contributing to climate change from its high emissions of the powerful greenhouse gas methane.

National emissions data from the US indicates conventional gas exploration and production is the largest anthropogenic source category of CH₄ (methane) emissions.¹⁵² A 2011 study from the Center for Atmospheric Research (NCAR), concluded that the substitution of gas for coal as an energy source results in increased rather than decreased global warming for many decades.¹⁵³

There are also localised pollutants associated with the mining and production of unconventional gas (eg coal seam gas). The process of hydraulic fracturing (also known as hydraulic stimulation and more commonly as fracking/fracking) used in unconventional gas mining involves the use of many chemicals, some of which are associated with short and long term health effects.²⁸

These chemicals are associated with detrimental health effects, including increased cardiovascular, respiratory, neurological, reproductive, cancer, endocrine and kidney disorders, cancer and birth defects.^{29, 30}

The gaseous emissions from unconventional gas activities also pose health risks. While little monitoring has been done of air quality around Australian gas fields, high levels of toxic air contaminants are found around US gas operations, including acrylonitrile, methylene chloride, benzene and hydrogen sulphide. These emissions increase the risk of cancer and may cause nervous system and respiratory damage.¹⁶⁰

The production of coal and unconventional gas threatens water supplies which also pose risk to health.³¹ The mining of coal and coal seam gas both pose a risk of contamination of underground aquifers and adjacent waterways with pollutants, as well as a risk to water security, since both require huge amounts of water.

Coal seam gas mining involves the removal of vast amounts of water which can affect the level of underground aquifers and may deplete them completely or leave them contaminated with chemicals.³³ This has serious implications for the agricultural industries and rural communities that rely on this source of water.

The National Water Commission reports that the Australian CSG industry could extract in the order of 7, 500 gigalitres of produce water* from groundwater systems over the next 25 years, equivalent to approximately 300 gigalitres per year. In comparison, the current total extraction from the Great Artesian Basin is approximately 540 gigalitres per year.³⁴

The National Water Commission has identified the following risks to sustainable water management in relation to coal seam gas:

- Extraction of large volumes of water will impact on surface and groundwater systems, including the Great Artesian Basin and Murray-Darling Basin
- Dramatic depressurisation of the coal seam can lead to changes in pressures of adjacent aquifers; reductions in surface water flows; and land subsidence over large areas, affecting surface water systems, ecosystems, irrigation and grazing lands.
- The release of large volumes of treated waste water from CSG mining could alter natural flow patterns and have significant impacts on water quality, and river and wetland health.
- Fracking and discharge of wastewater can cause cross-contamination between aquifers, with impacts on aquifer and groundwater quality.

Coal seam gas exploration and extraction threatens food and water security. Fracking operations use millions of litres of water for each well 164, 165 and raises serious concerns about risks to water quality and harm to underground aquifers.¹⁶⁶ These threats to surface and groundwater and the displacement of food production from fertile agricultural land, mean that unconventional gas operations have significant implications for food security.

Reliable access to clean and safe food and water are amongst the most basic fundamentals of ensuring good population health. Discharge water from coal seam gas wells has a high saline content and may contain fracking chemicals which can pollute adjacent waterways. Coal seam gas operations in Queensland are associated with incidents in which groundwater has become polluted with the chemicals benzene, toluene, ethylbenzene and xylene (BTEX).³⁶ The levels of benzene found in bores at the Arrow Energy fracking operation was between six and 15 times the levels allowable in the Australian drinking water guidelines.³⁷

Methane from unconventional gas operations involving shale gas in the USA has been found to contaminate drinking water in Pennsylvania and New York, with water wells near active drilling sites contaminated with methane at levels 17 times higher than wells in areas without drilling.³⁸

These risks to water require greater consideration within unconventional gas project approval processes, according to the National Water Commission, which urges a precautionary approach, saying:“CSG development represents a substantial risk to sustainable water management given the combination of material uncertainty about water impacts, the significance of potential impacts, and the long time period over which they may emerge and continue to have effect”.³⁹

Unconventional gas extraction also drives climate change and the associated negative health impacts. Firstly this is because large quantities of “fugitive” methane emissions are released during unconventional gas extraction. Methane is one of the most powerful of the short term greenhouse gases.

Over a 20 year period, methane is 72 times as powerful at greenhouse forcing as CO₂, ¹⁶⁷ making its containment as a greenhouse gas urgent. There is emerging evidence that suggests the climate impacts of gas mining and burning have been underestimated and the emissions from gas, particularly unconventional gas, may be much higher than currently reported levels.¹⁶⁸

In addition, gas from shale deposits (currently rapidly replacing conventional gas in the US and beginning to be developed in Western Australia) is estimated to have a higher greenhouse signature than coal, with the footprint of shale gas is at least 20% greater and perhaps more than twice as great over a 20 year period.¹⁶⁹ The risks for environmental harm and to health are similar to those from CSG fracking.¹⁷⁰



4. Security, innovation and energy productivity

Below is a brief summary of the actions the Australian Government is either currently pursuing, or which are proposed, to achieve the Goals in this chapter.

Secure and reliable energy supplies

The Australian Government will keep the standards and measurement capability needed for efficient markets. To continue reliable access to energy, the Australian Government monitors and identifies emerging issues through the periodic National Energy Security Assessment (NESA). Response mechanisms are available to industry and government to deal with unanticipated supply disruptions.

Improving energy productivity

The productive use of energy has environmental and economic benefits. A national approach to energy productivity, covering energy production and use for both stationary and transport energy, could deliver enhanced security of supply, respond to rising electricity and gas prices, and deliver emissions reductions.

Develop a better outlook capacity

The Australian Government currently assesses energy supply and use issues through the Australian Energy Resources Assessment (AERA), the Australian Energy Technology Assessments (AETA) and NESA. Better coordination of this reporting and consolidation of findings will give a more coordinated forward-looking view of threats and opportunities to security of supply.

Keep future energy technologies open

The Australian Government is actively identifying and removing unnecessary regulation. Regulation should be forward-looking so as not to slow the adoption of new technologies.

The Australian Government is supporting the demonstration and deployment of low emissions technologies. This includes investing over \$1 billion in renewable energy and over \$300 million in low emissions fossil fuel technology.

The Australian Government is investing \$476 million in the Industry Skills Fund to help Australian industry access and develop innovative training solutions so Australia will have the highly skilled workforce it needs.

Technology collaboration

The Australian Government has a focus on encouraging new technologies or adapting technologies to Australian conditions, improving collaboration between businesses and researchers, and promoting workforce innovation. The Australian Government supports energy-related research and development. It proposes to better target this work through setting national research priorities and reviewing the level of international technology collaboration engagement.

The Government seeks comments on ways the following goals for this chapter could be achieved.

Goals

- Maintain secure, competitively-priced and reliable energy supplies
 - Outcome: Consumers have access to adequate and reliable energy.
- Improve energy productivity
 - Outcome: Cost savings to Australian households and businesses, improved domestic security and reduced greenhouse gas emissions intensity.
- Develop a better 'outlook' capacity
 - Outcome: Government better prepared to respond to supply issues, to global market opportunities, and to invest strategically in research. Industry will have access to better information, giving more certainty and encouraging investment.
- Keep the range of energy options technology neutral by tackling regulatory barriers and making best use of research investments
 - Outcome: Australia is able to choose from the broadest possible range of energy options. This will strengthen Australia's energy security.
- Look for relevant international technology engagement
 - Outcome: Australian industries benefit from international experience.

Please provide any comments on Security, innovation and energy productivity below:

Reducing energy use from changing behaviour and improving the energy efficiency of appliances and buildings can reduce demand for energy. This is an important component of an energy transition plan away from fossil fuels. Improving the energy efficiency of buildings can reduce health risks through minimising fluctuations in temperature, reducing the incidence of heart disease, asthma, respiratory disease and strokes.^{247, 248}

The enhanced housing comfort associated with more consistent temperatures provided by energy efficiency measures is also associated with improved mental health.^{249, 250} Reducing the use of energy, or energy conservation, brings health and climate co-benefits.²⁵¹ Reduction in the consumption of energy can reduce greenhouse gas emissions through declines in production of energy generated from fossil fuel combustion. This also contributes to reduced air pollution, with improvements to population health as already described.

Decreasing emissions from coal fired power would save many lives by avoiding the problems listed above, and provide substantial productivity and economic benefits through avoided ill health.^{252, 253}

At present, Australia is failing to take advantage of the nation's abundant renewable energy resources. Renewable energy resources generate just 8% of Australian electricity, mainly from hydro and wind power. The increasing domestic installation of solar photovoltaic power is being attributed as a major factor in decreasing energy demand from the electricity grid, with demand declining 4% since 2008. Increasing rates of adoption of energy efficiency measures is another contributor.

Australia boasts the best solar resources in the world and among the world's best wind resources with higher average solar radiation per square metre than any other continent.²⁵⁴ The amount of the Sun's energy falling on Australia in one day is equal to half the total annual energy required by the whole

world.255

The rollout of renewable energy technologies in Australia has been slow due to uncertainty and volatility in the policy environment²⁵⁶ and historical differences in costs of renewable technologies and fossil fuel generation.²⁵⁷

The Zero Carbon Australia 2020 Plan developed by the Melbourne Energy Institute (MEI), University of Melbourne and research consultancy Beyond Zero Emissions²⁵⁸ demonstrates that Australia has sufficient non-fossil renewable energy resources to power its entire stationary energy sector and that a transition to 100% renewable energy is affordable and can be accomplished in a decade or so; that is, there are no technological or financial impediments for Australia to move to 100% renewable energy for its stationary energy (electricity) supply.

Wind can achieve a capacity factor of up to 45% in Australian conditions, and solar thermal can provide base-load (i.e. overnight) power due to its ability to store power for up to 16 hours. With upgrades to the national electricity grid to accommodate distributed generation, combined with energy efficiency improvements, renewable energy technologies could comfortably supply all Australia's power requirements.²⁵⁹

Modelling at the University at New South Wales also demonstrates that 100% renewable energy is feasible for Australia using commercially available technologies to supply high levels of variable resources such as wind and solar.²⁶⁰ This modelling suggests there needs to be a re-conception of the electricity supply-demand system to accommodate large volumes of variable resources in a great diversity of locations, and if this was achieved, a transition away from conventional base-load power could be accomplished entirely.

The 2010 report on renewable energy by the Australian Academy of Science found reliable renewable energy technologies such as wind and solar are commercially available right now for electricity generation.²⁶¹ This is also supported by research from Stanford University that shows that the world could be powered entirely with renewable energy within 20-40 years, using technology that is available today and at a cost comparable to that of conventional, fossil-fuel-based energy.²⁶²

Like the UNSW modelling and the MEI/BZE report, the Stanford modelling uses wind, water and solar as the predominant resources, finding that the barriers to the implementation of policy to deliver this scenario are not technological or financial but social and political.²⁶³

Evaluations of Australians' attitudes towards renewable energy suggest Australians "overwhelmingly support renewable energy", with the strongest support for solar, wind and hydro power.²⁶⁴ The benefits cited by people in both rural and urban areas include: reduced pollution, reduced electricity costs, and increased jobs.²⁶⁵

A CSIRO study of community attitudes to wind found strong community support for the development of wind farms in Australia and that community resistance attributable to visual amenity could be improved through effective community engagement.²⁶⁶

There are positive implications for jobs in an expanding renewable energy sector. Compared with fossil fuel technologies, the renewable energy industry is more labour intensive, with more jobs created for each unit of electricity generated from renewable sources than from fossil fuels.²⁶⁷

Australia possesses abundant renewable energy resources. A range of policy measures and strategies must be employed to drive a rapid transition to renewable energy and therefore reduce risks to health associated with carbon intensive energy systems, both from global warming, regional systemic threats to water and agriculture and from localised direct, immediate threats.

RECOMMENDATIONS

The Federal Government should:

Cease all subsidies to the fossil fuel industry including provision of infrastructure

Increase the renewable energy target to ensure that at least 60 per cent of Australia's electricity comes from renewable sources by 2020.

Commit to emissions reductions targets consistent with Australia's fair share of the global carbon budget, starting with 50% emissions reductions from 1990 levels by 2020

Increase the carbon price to accurately reflect the total costs associated with emitting each tonne of

greenhouse gases, including all hidden health and other costs

Establish a national enforceable air quality standard for fine particle pollution (PM 2.5) along with effective monitoring and regulation

Strengthen the national standard for ground level ozone and monitoring and enforcement regimes

Develop enforceable emissions standards for vehicles consistent with international best practice

Introduce project loan guarantees to support renewable energy deployment to reduce economic uncertainty and support the expansion of the renewable energy industry

Maximise energy efficiency in all government operations to reduce reliance on energy generated from fossil fuels

Develop mandatory environmental sustainability accreditation standards for healthcare

Reduce reliance on coal and fossil fuelled power by purchasing green energy from renewable sources

Facilitate infrastructure and create policy to increase the uptake of renewable powered electric or hybrid vehicles

Commit to funding for research to evaluate the health and social impacts of fossil fuels in affected communities in Australia

Invest in education and training opportunities to support the development of the workforce required to enable the economy to transition away from fossil fuels and support a just transition for fossil fuel workers to new industries

Establish national regulations to require comprehensive environmental, health and social impact assessments for all coal and unconventional gas exploration and mining projects in Australia

For impact assessments to include assessment of all pollutants associated with coal and unconventional gas activities including those associated with flaring, intentional venting, fugitive emissions, diesel use, production of mining waste and waste water

Commission independent full life cycle and cost-benefit analysis of the long-term environmental impacts of the fossil fuel industry that include clean-up and remediation of contaminated areas, treatment of wastewater, groundwater impacts, landfill capacity for waste products and accurate assessment of the industry's greenhouse gas contribution.

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